

3.9/93

day 45

$$P(t) = \frac{400,000}{50 + 7950e^{-0.5t}}$$

b) 11 ~ yrs.
14.53 ~ yrs

For you want to
calculate deriv of
variable you diff. w.r.t
what
X-Value?

c) $P'(t)$

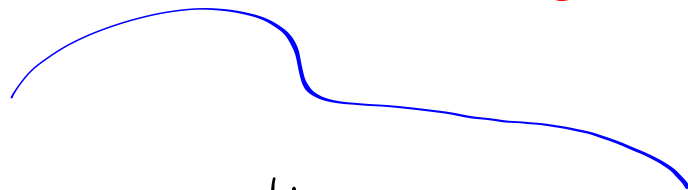
$$\text{nDeriv}(Y, X, 0)$$

math+8

24.843

$$\text{nDeriv}(Y, X, 5)$$

264.408



$$P(t) = \frac{400,000}{50 + 7950e^{-0.5t}}$$

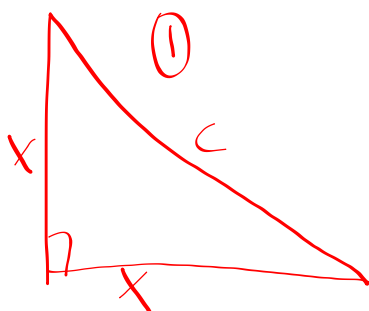
$$P(t) = 400000 (50 + 7950e^{-0.5t})^{-1}$$

$$P'(t) = 400000 (-1) (50 + 7950e^{-0.5t})^2 \frac{d}{dt} (50 + 7950e^{-0.5t})$$

$$= \frac{-400000 (-3975e^{-0.5t})}{(50 + 7950e^{-0.5t})^2}$$

3.11/81 $\frac{dc}{dt} = -4 \text{ m/s}$

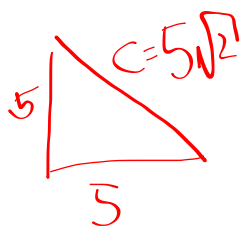
day 45



(2) $c^2 = 2x^2 \Rightarrow c = \sqrt{2}x$

(3) $2c \frac{dc}{dt} = 4x \frac{dx}{dt}$

$\sqrt{2}x \frac{dc}{dt} = 2x \frac{dx}{dt}$



(4) $\sqrt{2}(5)(-4) = 2(5) \frac{dx}{dt}$

$-2\sqrt{2} \text{ m/s} = \frac{dx}{dt}$

(a)

b) (3) $\sqrt{2}x \frac{dc}{dt} = 2x \frac{dx}{dt}$
 so $\frac{dc}{dt} = \sqrt{2} \frac{dx}{dt}$ \rightarrow (4) $-4 = \sqrt{2} \frac{dx}{dt}$
 $-2\sqrt{2} \text{ m/s} = \frac{dx}{dt}$

REAC 9

(2) $A = \frac{x^2}{2}$

(3) $\frac{dA}{dt} = x \frac{dx}{dt}$

(4)

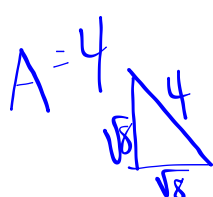
$\frac{dA}{dt} = 5(-2\sqrt{2}) \text{ m/sec}$

$\frac{dA}{dt} = -10\sqrt{2} \text{ m/sec}$

c)

(2) $A = \frac{1}{2}x^2$

(3) $\frac{dA}{dt} = x \frac{dx}{dt} = \frac{\sqrt{2}}{2}c \frac{dx}{dt}$



$\frac{dA}{dt} = \frac{\sqrt{2}}{2}(4)(-2\sqrt{2}) = -8 \text{ m}^2/\text{sec}$

day 45

$$3.9/15) \frac{d}{dx} \left(\ln \left(\frac{x+1}{x-1} \right) \right)$$

$$= \left(\frac{x-1}{x+1} \right) \frac{d}{dx} \left(\frac{x+1}{x-1} \right)$$

$$= \left(\frac{x-1}{x+1} \right) \left(-2(x-1)^{-2} \right)$$

$$= -2 \left(\frac{1}{(x+1)(x-1)} \right)$$

algebra
technique

$$\frac{x+1}{x-1} = \frac{x-1+2}{x-1}$$

$$= \frac{x-1}{x-1} + \frac{2}{x-1}$$

$$= 1 + 2(x-1)^{-1}$$

algebra
flashback

$$\frac{1}{\left(\frac{a}{b} \right)} = \frac{b}{a}$$

day 45

#2

$$\begin{aligned} & \frac{d}{dx} \left(\ln \left(\frac{x+1}{x-1} \right) \right) \\ &= \frac{d}{dx} \left(\ln(x+1) - \ln(x-1) \right) \\ &= \frac{1}{x+1} (1) - \frac{1}{x-1} (1) = \frac{(x-1) - (x+1)}{(x-1)(x+1)} \\ &= \frac{-2}{(x-1)(x+1)} \end{aligned}$$

day 45

3.10/43) $f(x) = \sqrt{x}$; $(2, 4)$ ←
 slope of line tangent to graph of $f^{-1}(x)$ at

$$(f^{-1})'(x) = \frac{1}{f'(f^{-1}(x))} \quad f'(x) = \frac{1}{2\sqrt{x}}$$

$$= \frac{1}{f'(4)} = \frac{1}{\left(\frac{1}{2\sqrt{4}}\right)} = 4 = \text{slope}$$

line $y - 4 = 4(x - 2)$

$$f(f^{-1}(x)) = x$$

$$f'(f^{-1}(x)) \cdot (f^{-1})'(x) = 1$$

$$\text{so } (f^{-1})'(x) = \frac{1}{f'(f^{-1}(x))}$$